

Cosmetic Preparations with Antibacterial Properties Comprising
Glycyrrhetic Acid

Field of the Invention

This invention relates generally to cosmetic preparations and, more particularly, to skin and hair care and cleaning products with an effective content of active components or mixtures of active components having
5 antibacterial properties.

Prior Art

Acne is understood by the expert to be a skin disease which is characterized by inflammatory and non-inflammatory pimples and which
10 can lead to the formation of pustules, abscesses and, finally, scars. Although there are various causes, acne can ultimately be attributed to blocked hair follicles (comedones). Besides hormonally induced blockage of hair follicle orifices by body fats, a major cause of acne is the development of tissue-damaging free fatty acids and enzymes by bacteria
15 such as, for example, *Propionibacterium acnes*. A large number of more or less effective substances which counteract the causes of acne are known from the prior art. Thus, the use of the zinc salt of glycyrrhetic acid is proposed in Spanish patent **ES 9702410 B1** (Vinyals).

However, apart from the pure pharmaceutical application where the
20 active components are used in high doses, there is also a need for preventively treating skin impurities in the cosmetics field. The problem addressed by the invention was to provide products containing highly effective active components which, even in small quantities, would inhibit the growth of, or destroy, the microorganisms responsible for the
25 development of acne without producing any unwanted secondary reactions,

such as reddening of the skin or other irritations, which have to be tolerated in the use of medicines. In addition, the active components would lend themselves to simple incorporation in typical cosmetic formulations and would be compatible with the other constituents of the formulation.

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Description of the Invention

The present invention relates to cosmetic preparations which are characterized in that they contain an effective quantity of glycyrrhetic acid and derivatives thereof.

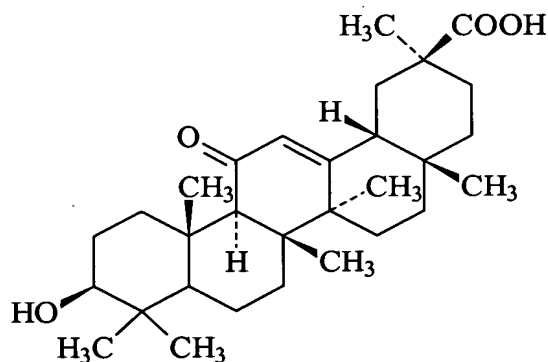
10 It has surprisingly been found that, even in small quantities, glycyrrhetic acid and glycyrrhetic acid derivatives are active against the germs responsible for acne, such as in particular *Staphylococcus epidermis*, *Staphylococcus aureus* and *Propionibacterium acnes*. Skin and hair care and cleaning preparations containing these substances, optionally
15 in combination with other antibacterial or antibiotic active components, protect the skin (scalp) against the development of acne and, by virtue of the low concentration, are dermatologically safe.

Glycyrrhetic acid and glycyrrhetic acid derivatives

20 Glycyrrhetic acid (see Figure) and glycyrrhetic acid derivatives are found as components in extracts of *Glycyrrhiza glabra*; derivatives containing a 1,2- β -sugar linkage are responsible for the licorice taste.

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However, not only can the pure acid be used for the purposes of the invention, the alkali metal, alkaline earth metal, ammonium, alkylammonium, alkanolammonium, glucammonium and zinc salts of glycyrrhetic acid, the esters of glycyrrhetic acid with linear or branched
5 aliphatic alcohols containing 1 to 18 carbon atoms and the full or partial esters of glycyrrhetic acid with polyols containing 2 to 15 carbon atoms and at least 2 hydroxyl groups may also be used either as alternatives or in the form of mixtures.

Typical examples are the sodium, potassium, ammonium,
10 triethanolammonium, glucammonium and zinc salts of glycyrrhetic acid, the esters of glycyrrhetic acid with methanol, ethanol, the isomeric propanols and butanols and caproic alcohol, caprylic alcohol, 2-ethylhexyl alcohol, capric alcohol, lauryl alcohol, isotridecyl alcohol, myristyl alcohol, cetyl alcohol, palmitoleyl alcohol, stearyl alcohol, isostearyl alcohol, oleyl alcohol,
15 elaidyl alcohol, petroselinyl alcohol, linolyl alcohol, linolenyl alcohol, elaeostearyl alcohol, arachyl alcohol, gadoleyl alcohol, behenyl alcohol, erucyl alcohol and brassidyl alcohol and mixtures thereof. Other examples are the full or partial esters of glycyrrhetic acid with glycerol; alkylene glycols such as, for example, ethylene glycol, diethylene glycol, propylene
20 glycol, butylene glycol, hexylene glycol and polyethylene glycols with an average molecular weight of 100 to 1,000 dalton; technical oligoglycerol mixtures with a degree of self-condensation of 1.5 to 10 such as, for example, diglycerol mixtures with a diglycerol content of 40 to 50% by weight; methylol compounds such as, in particular, trimethylolethane,
25 trimethylolpropane, trimethylolbutane, pentaerythritol and dipentaerythritol; lower alkyl glucosides, more particularly those containing 1 to 8 carbon atoms in the alkyl group, for example methyl and butyl glucoside; sugar alcohols containing 5 to 12 carbon atoms, for example sorbitol or mannitol; sugars containing 5 to 12 carbon atoms, for example glucose or sucrose;
30 amino sugars such as glucamine for example; or dialcoholamines, such as

diethanolamine or 2-aminopropane-1,3-diol. The potassium, ammonium and/or zinc salt of glycyrrhetic acid or the ester of glycyrrhetic acid with C₁₆₋₁₈ fatty alcohols are preferably used as component (b).

5 In a preferred embodiment of the invention, the extract of *Glycyrrhiza glabra* – which is typically a mixture of 18-β-glycyrrhetic acid, 18-β-glycyrrhetic acid potassium salt and 18-β-glycyrrhetic acid stearate – may be directly used instead of pure glycyrrhetic acid (for example Plantactiv® GLA, a Cognis product, with a purity of more than 98% by weight) or glycyrrhetic acid derivatives.

10 The preparations according to the invention typically contain the substances in quantities of 0.5 to 3% by weight and more particularly 1 to 2% by weight.

Antibacterial or antibiotic co-components

15 In a preferred embodiment of the present invention, the cosmetic preparations contain the glycyrrhetic acid or glycyrrhetic acid derivatives together with other antibacterial or antibiotic co-components such as, for example, azelaic acid and derivatives thereof, salicylic acid and derivatives thereof, benzoyl peroxide, hexachlorophene, dodecylbenzenesulfonic acid, 20 2,2',2'-nitrilotriethanol salts, dexpanthenol, resorcinol, erythromycin, plant extracts, for example extracts of green tea or olive leaves, coal tar and fine-particle sulfur and mixtures thereof. A synergistic effect in the control of the microorganisms is observed in particular with benzoyl peroxide. The cosmetic preparations may contain the other active components 25 individually in quantities of, again, 0.1 to 5, preferably 0.5 to 3 and more particularly 1 to 2% by weight, the ratio by weight between the glycyrrhetic acid or glycyrrhetic acid derivatives on the one hand and the other active components on the other hand being from 10:90 to 90:10, preferably from 25:75 to 75:25 and more particularly from 40:60 to 60:40.

Microcapsules

In another preferred embodiment of the invention, the glycyrrhetic acid or glycyrrhetic acid derivatives may be present in microencapsulated form, optionally together with the other antibacterial or antibiotic components. "Microcapsules" are understood by the expert to be spherical aggregates with a diameter of about 0.0001 to about 5 mm which contain at least one solid or liquid core surrounded by at least one continuous membrane. More precisely, they are finely dispersed liquid or solid phases coated with film-forming polymers, in the production of which the polymers are deposited onto the material to be encapsulated after emulsification and coacervation or interfacial polymerization. In another process, molten waxes are absorbed in a matrix ("microsponge") which, as microparticles, may be additionally coated with film-forming polymers. The microscopically small capsules, also known as nanocapsules, can be dried in the same way as powders. Besides single-core microcapsules, there are also multiple-core aggregates, also known as microspheres, which contain two or more cores distributed in the continuous membrane material. In addition, single-core or multiple-core microcapsules may be surrounded by an additional second, third etc. membrane. The membrane may consist of natural, semisynthetic or synthetic materials. Natural membrane materials are, for example, gum arabic, agar agar, agarose, maltodextrins, alginic acid and salts thereof, for example sodium or calcium alginate, fats and fatty acids, cetyl alcohol, collagen, chitosan, lecithins, gelatin, albumin, shellac, polysaccharides, such as starch or dextran, polypeptides, protein hydrolyzates, sucrose and waxes. Semisynthetic membrane materials are inter alia chemically modified celluloses, more particularly cellulose esters and ethers, for example cellulose acetate, ethyl cellulose, hydroxypropyl cellulose, hydroxypropyl methyl cellulose and carboxymethyl cellulose, and starch derivatives, more particularly starch ethers and esters. Synthetic membrane materials are, for example, polymers, such as polyacrylates,

polyamides, polyvinyl alcohol or polyvinyl pyrrolidone.

Examples of known microcapsules are the following commercial products (the membrane material is shown in brackets) *Hallcrest Microcapsules* (gelatin, gum arabic), *Coletica Thalaspheeres* (maritime collagen), *Lipotec Millicapseln* (alginic acid, agar agar), *Induchem Unispheres* (lactose, microcrystalline cellulose, hydroxypropylmethyl cellulose), *Unicerin C30* (lactose, microcrystalline cellulose, hydroxypropylmethyl cellulose), *Kobo Glycospheres* (modified starch, fatty acid esters, phospholipids), *Softspheres* (modified agar agar), *Kuhs Probiol Nanospheres* (phospholipids), *Primaspheres* and *Primasponges* (chitosan, alginates) and *Primasys* (phospholipids). Chitosan microcapsules and processes for their production are the subject of earlier patent applications filed by applicants [WO 01/01926, WO 01/01927, WO 01/01928, WO 01/01929]. Microcapsules with mean diameters of 0.0001 to 5, preferably 0.001 to 0.5 and more particularly 0.005 to 0.1 mm, which consist of a membrane and a matrix containing the active components, may be obtained, for example, by

- (a1) preparing a matrix from gel formers, chitosans and active components,
 - (a2) optionally dispersing the matrix in an oil phase and
 - (a3) treating the dispersed matrix with aqueous solutions of anionic polymers and optionally removing the oil phase in the process
- or
- (b1) preparing a matrix from gel formers, anionic polymers and active components,
 - (b2) optionally dispersing the matrix in an oil phase and
 - (b3) treating the dispersed matrix with aqueous chitosan solutions and optionally removing the oil phase in the process
- or

- (c1) processing aqueous active-component preparations with oil components in the presence of emulsifiers to form o/w emulsions,
- (c2) treating the emulsions thus obtained with aqueous solutions of anionic polymers,
- 5 (c3) contacting the matrix thus obtained with aqueous chitosan or cationic polymer solutions and
- (c4) removing the encapsulated products thus obtained from the aqueous phase.

10 To produce the microcapsules, a 1 to 10 and preferably 2 to 5% by weight aqueous solution of the gel former, preferably agar agar, is normally prepared and heated under reflux. A second aqueous solution containing the chitosan in quantities of 0.1 to 2 and preferably 0.25 to 0.5% by weight and the active substances in quantities of 0.1 to 25 and preferably 0.25 to 15 10% by weight is added in the boiling heat, preferably at 80 to 100°C; this mixture is called the matrix. Accordingly, the charging of the microcapsules with active substances may also comprise 0.1 to 25% by weight, based on the weight of the capsules. If desired, water-insoluble constituents, for example inorganic pigments, may be added at this stage to adjust viscosity, 20 generally in the form of aqueous or aqueous/alcoholic dispersions. In addition, to emulsify or disperse the active substances, it can be useful to add emulsifiers and/or solubilizers to the matrix. After its preparation from gel former, chitosan and active substances, the matrix may optionally be very finely dispersed in an oil phase with intensive shearing in order to 25 produce small particles in the subsequent encapsulation process. It has proved to be particularly advantageous in this regard to heat the matrix to temperatures in the range from 40 to 60°C while the oil phase is cooled to 10 to 20°C. The actual encapsulation, i.e. formation of the membrane by contacting the chitosan in the matrix with the anionic polymers, takes place 30 in the last, again compulsory step. To this end, it is advisable to wash the

matrix optionally dispersed in the oil phase with an aqueous ca. 1 to 50 and preferably 10 to 15% by weight aqueous solution of the anionic polymer and, if necessary, to remove the oil phase either at the same time or afterwards. The resulting aqueous preparations generally have a
5 microcapsule content of 1 to 10% by weight. In some cases, it can be of advantage for the solution of the polymers to contain other ingredients, for example emulsifiers or preservatives. After filtration, microcapsules with a mean diameter of preferably about 1 mm are obtained. It is advisable to sieve the capsules to ensure a uniform size distribution. The
10 microcapsules thus obtained may have any shape within production-related limits, but are preferably substantially spherical. Alternatively, the anionic polymers may also be used for the preparation of the matrix and encapsulation may be carried out with the chitosans.

An alternative process for the production of the microcapsules
15 according to the invention comprises initially preparing an o/w emulsion which, besides the oil component, water and the active components, contains an effective quantity of emulsifier. To form the matrix, a suitable quantity of an aqueous anionic polymer solution is added to this preparation with vigorous stirring. The membrane is formed by addition of
20 the chitosan solution. The entire process preferably takes place at a mildly acidic pH of 3 to 4. If necessary, the pH is adjusted by addition of mineral acid. After formation of the membrane, the pH is increased to a value of 5 to 6, for example by addition of triethanolamine or another base. This results in an increase in viscosity which can be supported by addition of
25 other thickeners such as, for example, polysaccharides, more particularly xanthan gum, guar gum, agar agar, alginates and tyloses, carboxymethyl cellulose and hydroxyethyl cellulose, relatively high molecular weight polyethylene glycol mono- and diesters of fatty acids, polyacrylates, polyacrylamides and the like. Finally, the microcapsules are separated
30 from the aqueous phase, for example by decantation, filtration or

centrifuging.

Commercial Applications

5 The present invention also relates to the use of glycyrrhetic acid and/or glycyrrhetic acid derivatives for the production of cosmetic preparations, more particularly skin and hair care preparations, in which they may be present – optionally together with other active components – in quantities of 0.1 to 5, preferably 0.5 to 3 and more particularly 1 to 2% by weight, based on the preparation.

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Cosmetic preparations

The glycyrrhetic acid and glycyrrhetic acid derivatives may be used for the production of cosmetic preparations such as, for example, hair shampoos, hair lotions, foam baths, shower baths, creams, gels, lotions, 15 alcoholic and aqueous/alcoholic solutions, emulsions, wax/fat compounds or stick preparations. These preparations may also contain mild surfactants, oil components, emulsifiers, pearlizing waxes, consistency factors, thickeners, superfatting agents, stabilizers, polymers, silicone compounds, fats, waxes, lecithins, phospholipids, UV protection factors, 20 biogenic agents, antioxidants, deodorants, antiperspirants, antidandruff agents, film formers, swelling agents, insect repellents, self-tanning agents, tyrosine inhibitors (depigmenting agents), hydrotropes, solubilizers, preservatives, perfume oils, dyes and the like as further auxiliaries and additives.

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Surfactants

Suitable surfactants are anionic, nonionic, cationic and/or amphoteric or zwitterionic surfactants which may be present in the preparations in quantities of normally about 1 to 70% by weight, preferably 30 5 to 50% by weight and more preferably 10 to 30% by weight. Typical

examples of anionic surfactants are soaps, alkyl benzenesulfonates, alkanesulfonates, olefin sulfonates, alkylether sulfonates, glycerol ether sulfates, α -methyl ester sulfonates, sulfofatty acids, alkyl sulfates, alkyl ether sulfates, glycerol ether sulfates, fatty acid ether sulfates, hydroxy mixed ether sulfates, monoglyceride (ether) sulfates, fatty acid amide (ether) sulfates, mono- and dialkyl sulfosuccinates, mono- and dialkyl sulfosuccinamates, sulfotriglycerides, amide soaps, ether carboxylic acids and salts thereof, fatty acid isethionates, fatty acid sarcosinates, fatty acid taurides, N-acylamino acids such as, for example, acyl lactylates, acyl tartrates, acyl glutamates and acyl aspartates, alkyl oligoglucoside sulfates, protein fatty acid condensates (particularly wheat-based vegetable products) and alkyl (ether) phosphates. If the anionic surfactants contain polyglycol ether chains, they may have a conventional homolog distribution although they preferably have a narrow-range homolog distribution.

Typical examples of nonionic surfactants are fatty alcohol polyglycol ethers, alkylphenol polyglycol ethers, fatty acid polyglycol esters, fatty acid amide polyglycol ethers, fatty amine polyglycol ethers, alkoxylated triglycerides, mixed ethers and mixed formals, optionally partly oxidized alk(en)yl oligoglycosides or glucuronic acid derivatives, fatty acid-N-alkyl glucamides, protein hydrolyzates (particularly wheat-based vegetable products), polyol fatty acid esters, sugar esters, sorbitan esters, polysorbates and amine oxides. If the nonionic surfactants contain polyglycol ether chains, they may have a conventional homolog distribution, although they preferably have a narrow-range homolog distribution. Typical

examples of cationic surfactants are quaternary ammonium compounds, for example dimethyl distearyl ammonium chloride, and esterquats, more particularly quaternized fatty acid trialkanolamine ester salts. Typical examples of amphoteric or zwitterionic surfactants are alkylbetaines, alkylamidobetaines, aminopropionates, aminoglycinates, imidazolinium betaines and sulfobetaines. The surfactants mentioned are all known

compounds. Typical examples of particularly suitable mild, i.e. particularly dermatologically compatible, surfactants are fatty alcohol polyglycol ether sulfates, monoglyceride sulfates, mono- and/or dialkyl sulfosuccinates, fatty acid isethionates, fatty acid sarcosinates, fatty acid taurides, fatty acid glutamates, α -olefin sulfonates, ether carboxylic acids, alkyl oligoglucosides, fatty acid glucamides, alkylamidobetaines, amphoacetals and/or protein fatty acid condensates, preferably based on wheat proteins.

Oil components

Suitable oil components are, for example, Guerbet alcohols based on fatty alcohols containing 6 to 18 and preferably 8 to 10 carbon atoms, esters of linear C₆₋₂₂ fatty acids with linear or branched C₆₋₂₂ fatty alcohols or esters of branched C₆₋₁₃ carboxylic acids with linear or branched C₆₋₂₂ fatty alcohols such as, for example, myristyl myristate, myristyl palmitate, myristyl stearate, myristyl isostearate, myristyl oleate, myristyl behenate, myristyl erucate, cetyl myristate, cetyl palmitate, cetyl stearate, cetyl isostearate, cetyl oleate, cetyl behenate, cetyl erucate, stearyl myristate, stearyl palmitate, stearyl stearate, stearyl isostearate, stearyl oleate, stearyl behenate, stearyl erucate, isostearyl myristate, isostearyl palmitate, isostearyl stearate, isostearyl isostearate, isostearyl oleate, isostearyl behenate, isostearyl oleate, oleyl myristate, oleyl palmitate, oleyl stearate, oleyl isostearate, oleyl oleate, oleyl behenate, oleyl erucate, behenyl myristate, behenyl palmitate, behenyl stearate, behenyl isostearate, behenyl oleate, behenyl behenate, behenyl erucate, erucyl myristate, erucyl palmitate, erucyl stearate, erucyl isostearate, erucyl oleate, erucyl behenate and erucyl erucate. Also suitable are esters of linear C₆₋₂₂ fatty acids with branched alcohols, more particularly 2-ethyl hexanol, esters of C₁₈₋₃₈ alkylhydroxycarboxylic acids with linear or branched C₆₋₂₂ fatty alcohols, more especially Dioctyl Malate, esters of linear and/or branched fatty acids with polyhydric alcohols (for example propylene glycol, dimer

diol or trimer triol) and/or Guerbet alcohols, triglycerides based on C₆₋₁₀ fatty acids, liquid mono-, di- and triglyceride mixtures based on C₆₋₁₈ fatty acids, esters of C₆₋₂₂ fatty alcohols and/or Guerbet alcohols with aromatic carboxylic acids, more particularly benzoic acid, esters of C₂₋₁₂ dicarboxylic acids with linear or branched alcohols containing 1 to 22 carbon atoms or polyols containing 2 to 10 carbon atoms and 2 to 6 hydroxyl groups, vegetable oils, branched primary alcohols, substituted cyclohexanes, linear and branched C₆₋₂₂ fatty alcohol carbonates, such as Dicaprylyl Carbonate (Cetiol® CC) for example, Guerbet carbonates based on C₆₋₁₈ and preferably C₈₋₁₀ fatty alcohols, esters of benzoic acid with linear and/or branched C₆₋₂₂ alcohols (for example Finsolv® TN), linear or branched, symmetrical or nonsymmetrical dialkyl ethers containing 6 to 22 carbon atoms per alkyl group, such as Dicaprylyl Ether (Cetiol® OE) for example, ring opening products of epoxidized fatty acid esters with polyols, silicone oils (cyclomethicone, silicon methicone types, etc.) and/or aliphatic or naphthenic hydrocarbons such as, for example, squalane, squalene or dialkyl cyclohexanes.

Emulsifiers

Suitable emulsifiers are, for example, nonionic surfactants from at least one of the following groups:

- products of the addition of 2 to 30 mol ethylene oxide and/or 0 to 5 mol propylene oxide onto linear C₈₋₂₂ fatty alcohols, onto C₁₂₋₂₂ fatty acids, onto alkyl phenols containing 8 to 15 carbon atoms in the alkyl group and onto alkylamines containing 8 to 22 carbon atoms in the alkyl group;
- alkyl and/or alkenyl oligoglycosides containing 8 to 22 carbon atoms in the alk(en)yl group and ethoxylated analogs thereof;
- addition products of 1 to 15 mol ethylene oxide onto castor oil and/or

- hydrogenated castor oil;
- addition products of 15 to 60 mol ethylene oxide onto castor oil and/or hydrogenated castor oil;
 - partial esters of glycerol and/or sorbitan with unsaturated, linear or saturated, branched fatty acids containing 12 to 22 carbon atoms and/or hydroxycarboxylic acids containing 3 to 18 carbon atoms and addition products thereof onto 1 to 30 mol ethylene oxide;
 - partial esters of polyglycerol (average degree of self-condensation 2 to 8), polyethylene glycol (molecular weight 400 to 5,000), trimethylolpropane, pentaerythritol, sugar alcohols (for example sorbitol), alkyl glucosides (for example methyl glucoside, butyl glucoside, lauryl glucoside) and polyglucosides (for example cellulose) with saturated and/or unsaturated, linear or branched fatty acids containing 12 to 22 carbon atoms and/or hydroxycarboxylic acids containing 3 to 18 carbon atoms and addition products thereof onto 1 to 30 mol ethylene oxide;
 - mixed esters of pentaerythritol, fatty acids, citric acid and fatty alcohol and/or mixed esters of fatty acids containing 6 to 22 carbon atoms, methyl glucose and polyols, preferably glycerol or polyglycerol,
 - mono-, di- and trialkyl phosphates and mono-, di- and/or tri-PEG-alkyl phosphates and salts thereof,
 - wool wax alcohols,
 - polysiloxane/polyalkyl/polyether copolymers and corresponding derivatives,
 - block copolymers, for example Polyethyleneglycol-30 Dipolyhydroxystearate;
 - polymer emulsifiers, for example Pemulen types (TR-1, TR-2) of Goodrich;
 - polyalkylene glycols and

➤ glycerol carbonate.

➤ Ethylene oxide addition products

5 The addition products of ethylene oxide and/or propylene
oxide onto fatty alcohols, fatty acids, alkylphenols or onto castor oil
are known commercially available products. They are homolog
mixtures of which the average degree of alkoxylation corresponds to
the ratio between the quantities of ethylene oxide and/or propylene
oxide and substrate with which the addition reaction is carried out.
10 C_{12/18} fatty acid monoesters and diesters of addition products of
ethylene oxide onto glycerol are known as lipid layer enhancers for
cosmetic preparations.

➤ Alkyl and/or alkenyl oligoglycosides

15 Alkyl and/or alkenyl oligoglycosides, their production and their
use are known from the prior art. They are produced in particular by
reacting glucose or oligosaccharides with primary alcohols
containing 8 to 18 carbon atoms. So far as the glycoside unit is
concerned, both monoglycosides in which a cyclic sugar unit is
20 attached to the fatty alcohol by a glycoside bond and oligomeric
glycosides with a degree of oligomerization of preferably up to about
8 are suitable. The degree of oligomerization is a statistical mean
value on which the homolog distribution typical of such technical
products is based.

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➤ Partial glycerides

 Typical examples of suitable partial glycerides are
hydroxystearic acid monoglyceride, hydroxystearic acid diglyceride,
isostearic acid monoglyceride, isostearic acid diglyceride, oleic acid
30 monoglyceride, oleic acid diglyceride, ricinoleic acid monoglyceride,

ricinoleic acid diglyceride, linoleic acid monoglyceride, linoleic acid diglyceride, linolenic acid monoglyceride, linolenic acid diglyceride, erucic acid monoglyceride, erucic acid diglyceride, tartaric acid monoglyceride, tartaric acid diglyceride, citric acid monoglyceride, citric acid diglyceride, malic acid monoglyceride, malic acid diglyceride and technical mixtures thereof which may still contain small quantities of triglyceride from the production process. Addition products of 1 to 30 and preferably 5 to 10 mol ethylene oxide onto the partial glycerides mentioned are also suitable.

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➤ Sorbitan esters

Suitable sorbitan esters are sorbitan monoisostearate, sorbitan sesquiisostearate, sorbitan diisostearate, sorbitan trisostearate, sorbitan monooleate, sorbitan sesquioleate, sorbitan dioleate, sorbitan trioleate, sorbitan monoerucate, sorbitan sesquierucate, sorbitan dierucate, sorbitan trierucate, sorbitan monoricinoleate, sorbitan sesquiricinoleate, sorbitan diricinoleate, sorbitan triricinoleate, sorbitan monohydroxystearate, sorbitan sesquihydroxystearate, sorbitan dihydroxystearate, sorbitan trihydroxystearate, sorbitan monotartrate, sorbitan sesquitartrate, sorbitan ditartrate, sorbitan tritartrate, sorbitan monocitrate, sorbitan sesquicitrate, sorbitan dicitrate, sorbitan tricitrate, sorbitan monomaleate, sorbitan sesquimaleate, sorbitan dimaleate, sorbitan trimaleate and technical mixtures thereof. Addition products of 1 to 30 and preferably 5 to 10 mol ethylene oxide onto the sorbitan esters mentioned are also suitable.

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➤ Polyglycerol esters

Typical examples of suitable polyglycerol esters are Polyglyceryl-2 Dipolyhydroxystearate (Dehymuls® PGPH),

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5 Polyglycerin-3-Diisostearate (Lameform® TGI), Polyglyceryl-4 Isostearate (Isolan® GI 34), Polyglyceryl-3 Oleate, Diisostearyl Polyglyceryl-3 Diisostearate (Isolan® PDI), Polyglyceryl-3 Methylglucose Distearate (Tego Care® 450), Polyglyceryl-3 Beeswax (Cera Bellina®), Polyglyceryl-4 Caprate (Polyglycerol Caprate T2010/90), Polyglyceryl-3 Cetyl Ether (Chimexane® NL), Polyglyceryl-3 Distearate (Cremophor® GS 32) and Polyglyceryl Polyricinoleate (Admul® WOL 1403), Polyglyceryl Dimerate Iso-
10 stearate and mixtures thereof. Examples of other suitable polyolesters are the mono-, di- and triesters of trimethylolpropane or pentaerythritol with lauric acid, cocofatty acid, tallow fatty acid, palmitic acid, stearic acid, oleic acid, behenic acid and the like optionally reacted with 1 to 30 mol ethylene oxide.

15 ➤ Anionic emulsifiers

Typical anionic emulsifiers are aliphatic fatty acids containing 12 to 22 carbon atoms such as, for example, palmitic acid, stearic acid or behenic acid and dicarboxylic acids containing 12 to 22 carbon atoms such as, for example, azelaic acid or sebacic acid.

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➤ Amphoteric and cationic emulsifiers

Other suitable emulsifiers are zwitterionic surfactants. Zwitterionic surfactants are surface-active compounds which contain at least one quaternary ammonium group and at least one carboxylate and one sulfonate group in the molecule. Particularly
25 suitable zwitterionic surfactants are the so-called betaines, such as the N-alkyl-N,N-dimethyl ammonium glycinate, for example cocoalkyl dimethyl ammonium glycinate, N-acylaminopropyl-N,N-dimethyl ammonium glycinate, for example cocoacylaminopropyl
30 dimethyl ammonium glycinate, and 2-alkyl-3-carboxymethyl-3-

hydroxyethyl imidazolines containing 8 to 18 carbon atoms in the alkyl or acyl group and cocoacylaminoethyl hydroxyethyl carboxymethyl glycinate. The fatty acid amide derivative known under the CTFA name of *Cocamidopropyl Betaine* is particularly preferred. Ampholytic surfactants are also suitable emulsifiers. Ampholytic surfactants are surface-active compounds which, in addition to a C_{8/18} alkyl or acyl group, contain at least one free amino group and at least one -COOH- or -SO₃H- group in the molecule and which are capable of forming inner salts. Examples of suitable ampholytic surfactants are N-alkyl glycines, N-alkyl propionic acids, N-alkylaminobutyric acids, N-alkyliminodipropionic acids, N-hydroxyethyl-N-alkylamidopropyl glycines, N-alkyl taurines, N-alkyl sarcosines, 2-alkylaminopropionic acids and alkylaminoacetic acids containing around 8 to 18 carbon atoms in the alkyl group. Particularly preferred ampholytic surfactants are N-coco-alkylaminopropionate, cocoacylaminoethyl aminopropionate and C_{12/18} acyl sarcosine. Finally, cationic surfactants are also suitable emulsifiers, those of the esterquat type, preferably methyl-quaternized difatty acid triethanolamine ester salts, being particularly preferred.

Fats and waxes

Typical examples of fats are glycerides, i.e. solid or liquid, vegetable or animal products which consist essentially of mixed glycerol esters of higher fatty acids. Suitable waxes are inter alia natural waxes such as, for example, candelilla wax, carnauba wax, Japan wax, espartograss wax, cork wax, guaruma wax, rice oil wax, sugar cane wax, ouricury wax, montan wax, beeswax, shellac wax, spermaceti, lanolin (wool wax), uropygial fat, ceresine, ozocerite (earth wax), petrolatum, paraffin waxes and microwaxes; chemically modified waxes (hard waxes) such as, for

example, montan ester waxes, sasol waxes, hydrogenated jojoba waxes and synthetic waxes such as, for example, polyalkylene waxes and polyethylene glycol waxes. Besides the fats, other suitable additives are fat-like substances, such as lecithins and phospholipids. Lecithins are known among experts as glycerophospholipids which are formed from fatty acids, glycerol, phosphoric acid and choline by esterification. Accordingly, lecithins are also frequently referred to by experts as phosphatidyl cholines (PCs). Examples of natural lecithins are the kephalins which are also known as phosphatidic acids and which are derivatives of 1,2-diacyl-sn-glycerol-3-phosphoric acids. By contrast, phospholipids are generally understood to be mono- and preferably diesters of phosphoric acid with glycerol (glycerophosphates) which are normally classed as fats. Sphingosines and sphingolipids are also suitable.

15 Pearlizing waxes

Suitable pearlizing waxes are, for example, alkylene glycol esters, especially ethylene glycol distearate; fatty acid alkanolamides, especially cocofatty acid diethanolamide; partial glycerides, especially stearic acid monoglyceride; esters of polybasic, optionally hydroxysubstituted carboxylic acids with fatty alcohols containing 6 to 22 carbon atoms, especially long-chain esters of tartaric acid; fatty compounds, such as for example fatty alcohols, fatty ketones, fatty aldehydes, fatty ethers and fatty carbonates which contain in all at least 24 carbon atoms, especially laurone and distearylether; fatty acids, such as stearic acid, hydroxystearic acid or behenic acid, ring opening products of olefin epoxides containing 12 to 22 carbon atoms with fatty alcohols containing 12 to 22 carbon atoms and/or polyols containing 2 to 15 carbon atoms and 2 to 10 hydroxyl groups and mixtures thereof.

Consistency factors and thickeners

The consistency factors mainly used are fatty alcohols or hydroxyfatty alcohols containing 12 to 22 and preferably 16 to 18 carbon atoms and also partial glycerides, fatty acids or hydroxyfatty acids. A combination of these substances with alkyl oligoglucosides and/or fatty acid N-methyl glucamides of the same chain length and/or polyglycerol poly-12-hydroxystearates is preferably used. Suitable thickeners are, for example, Aerosil® types (hydrophilic silicas), polysaccharides, more especially xanthan gum, guar-guar, agar-agar, alginates and tyloses, carboxymethyl cellulose and hydroxyethyl cellulose, also relatively high molecular weight polyethylene glycol monoesters and diesters of fatty acids, polyacrylates (for example Carbopols® and Pemulen types [Goodrich]; Synthalens® [Sigma]; Keltrol types [Kelco]; Sepigel types [Seppic]; Salcare types [Allied Colloids]), polyacrylamides, polymers, polyvinyl alcohol and polyvinyl pyrrolidone. Other consistency factors which have proved to be particularly effective are bentonites, for example Bentone® Gel VS-5PC (Rheox) which is a mixture of cyclopentasiloxane, Disteardimonium Hectorite and propylene carbonate. Other suitable consistency factors are surfactants such as, for example, ethoxylated fatty acid glycerides, esters of fatty acids with polyols, for example pentaerythritol or trimethylol propane, narrow-range fatty alcohol ethoxylates or alkyl oligoglucosides and electrolytes, such as sodium chloride and ammonium chloride.

Superfatting agents

Superfatting agents may be selected from such substances as, for example, lanolin and lecithin and also polyethoxylated or acylated lanolin and lecithin derivatives, polyol fatty acid esters, monoglycerides and fatty acid alkanolamides, the fatty acid alkanolamides also serving as foam stabilizers.

Stabilizers

Metal salts of fatty acids such as, for example, magnesium, aluminium and/or zinc stearate or ricinoleate may be used as stabilizers.

5 Polymers

Suitable cationic polymers are, for example, cationic cellulose derivatives such as, for example, the quaternized hydroxyethyl cellulose obtainable from Amerchol under the name of Polymer JR 400®, cationic starch, copolymers of diallyl ammonium salts and acrylamides, quaternized
10 vinyl pyrrolidone/vinyl imidazole polymers such as, for example, Luviquat® (BASF), condensation products of polyglycols and amines, quaternized collagen polypeptides such as, for example, Lauryldimonium Hydroxypropyl Hydrolyzed Collagen (Lamequat® L, Grünau), quaternized wheat poly-
peptides, polyethyleneimine, cationic silicone polymers such as, for
15 example, amodimethicone, copolymers of adipic acid and dimethylamino-hydroxypropyl diethylenetriamine (Cartaretine®, Sandoz), copolymers of acrylic acid with dimethyl diallyl ammonium chloride (Merquat® 550, Chemviron), polyaminopolyamides and crosslinked water-soluble polymers thereof, cationic chitin derivatives such as, for example, quaternized
20 chitosan, optionally in microcrystalline distribution, condensation products of dihaloalkyls, for example dibromobutane, with bis-dialkylamines, for example bis-dimethylamino-1,3-propane, cationic guar gum such as, for example, Jaguar®CBS, Jaguar®C-17, Jaguar®C-16 of Celanese, quaternized ammonium salt polymers such as, for example, Mirapol® A-15,
25 Mirapol® AD-1, Mirapol® AZ-1 of Miranol.

Suitable anionic, zwitterionic, amphoteric and nonionic polymers are, for example, vinyl acetate/crotonic acid copolymers, vinyl pyrrolidone/vinyl acrylate copolymers, vinyl acetate/butyl maleate/isobornyl acrylate copolymers, methyl vinylether/maleic anhydride copolymers and esters
30 thereof, uncrosslinked and polyol-crosslinked polyacrylic acids, acrylamido-

propyl trimethylammonium chloride/acrylate copolymers, octylacrylamide/methyl methacrylate/tert.-butylaminoethyl methacrylate/2-hydroxypropyl methacrylate copolymers, polyvinyl pyrrolidone, vinyl pyrrolidone/vinyl acetate copolymers, vinyl pyrrolidone/dimethylaminoethyl
5 methacrylate/vinyl caprolactam terpolymers and optionally derivatized cellulose ethers and silicones.

Silicone compounds

Suitable silicone compounds are, for example, dimethyl polysiloxanes, methylphenyl polysiloxanes, cyclic silicones and amino-, fatty acid-,
10 alcohol-, polyether-, epoxy-, fluorine-, glycoside- and/or alkyl-modified silicone compounds which may be both liquid and resin-like at room temperature. Other suitable silicone compounds are simethicones which are mixtures of dimethicones with an average chain length of 200 to 300
15 dimethylsiloxane units and hydrogenated silicates.

UV protection factors

UV protection factors in the context of the invention are, for example, organic substances (light filters) which are liquid or crystalline at room
20 temperature and which are capable of absorbing ultraviolet radiation and of releasing the energy absorbed in the form of longer-wave radiation, for example heat. UV-B filters can be oil-soluble or water-soluble. The following are examples of oil-soluble substances:

- 25 ➤ 3-benzylidene camphor or 3-benzylidene norcamphor and derivatives thereof, for example 3-(4-methylbenzylidene)-camphor;
- 4-aminobenzoic acid derivatives, preferably 4-(dimethylamino)-benzoic acid-2-ethylhexyl ester, 4-(dimethylamino)-benzoic acid-2-octyl ester and 4-(dimethylamino)-benzoic acid amyl ester;
- 30 ➤ esters of cinnamic acid, preferably 4-methoxycinnamic acid-2-ethylhexyl

ester, 4-methoxycinnamic acid propyl ester, 4-methoxycinnamic acid isoamyl ester, 2-cyano-3,3-phenylcinnamic acid-2-ethylhexyl ester (Octocrylene);

- esters of salicylic acid, preferably salicylic acid-2-ethylhexyl ester, 5 salicylic acid-4-isopropylbenzyl ester, salicylic acid homomenthyl ester;
- derivatives of benzophenone, preferably 2-hydroxy-4-methoxybenzophenone, 2-hydroxy-4-methoxy-4'-methylbenzophenone, 2,2'-dihydroxy-4-methoxybenzophenone;
- esters of benzalmalonic acid, preferably 4-methoxybenzalmalonic acid 10 di-2-ethylhexyl ester;
- triazine derivatives such as, for example, 2,4,6-trianilino-(p-carbo-2'-ethyl-1'-hexyloxy)-1,3,5-triazine and Octyl Triazone or Dioctyl Butamido Triazone (Uvasorb® HEB);
- propane-1,3-diones such as, for example, 1-(4-tert.butylphenyl)-3-(4'- 15 methoxyphenyl)-propane-1,3-dione;
- ketotricyclo(5.2.1.0)decane derivatives.

Suitable water-soluble substances are

- 20 ➤ 2-phenylbenzimidazole-5-sulfonic acid and alkali metal, alkaline earth metal, ammonium, alkylammonium, alkanolammonium and glucammonium salts thereof;
- sulfonic acid derivatives of benzophenones, preferably 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid and salts thereof;
- 25 ➤ sulfonic acid derivatives of 3-benzylidene camphor such as, for example, 4-(2-oxo-3-bornylidenemethyl)-benzene sulfonic acid and 2-methyl-5-(2-oxo-3-bornylidene)-sulfonic acid and salts thereof.

Typical UV-A filters are, in particular, derivatives of benzoyl methane 30 such as, for example, 1-(4'-tert.butylphenyl)-3-(4'-methoxyphenyl)-propane-

1,3-dione, 4-tert.butyl-4'-methoxydibenzoyl methane (Parsol® 1789), 1-phenyl-3-(4'-isopropylphenyl)-propane-1,3-dione and enamine compounds. The UV-A and UV-B filters may of course also be used in the form of mixtures. Particularly favorable combinations consist of the derivatives of
5 benzoyl methane, for example 4-tert.butyl-4'-methoxydibenzoylmethane (Parsol® 1789) and 2-cyano-3,3-phenylcinnamic acid-2-ethyl hexyl ester (Octocrylene) in combination with esters of cinnamic acid, preferably 4-methoxycinnamic acid-2-ethyl hexyl ester and/or 4-methoxycinnamic acid propyl ester and/or 4-methoxycinnamic acid isoamyl ester. Combinations
10 such as these are advantageously combined with water-soluble filters such as, for example, 2-phenylbenzimidazole-5-sulfonic acid and alkali metal, alkaline earth metal, ammonium, alkylammonium, alkanolammonium and glucammonium salts thereof.

Besides the soluble substances mentioned, insoluble light-blocking
15 pigments, i.e. finely dispersed metal oxides or salts, may also be used for this purpose. Examples of suitable metal oxides are, in particular, zinc oxide and titanium dioxide and also oxides of iron, zirconium oxide, silicon, manganese, aluminium and cerium and mixtures thereof. Silicates (talcum), barium sulfate and zinc stearate may be used as salts. The
20 oxides and salts are used in the form of the pigments for skin-care and skin-protecting emulsions and decorative cosmetics. The particles should have a mean diameter of less than 100 nm, preferably between 5 and 50 nm and more preferably between 15 and 30 nm. They may be spherical in shape although ellipsoidal particles or other non-spherical particles may
25 also be used. The pigments may also be surface-treated, i.e. hydrophilicized or hydrophobicized. Typical examples are coated titanium dioxides, for example Titandioxid T 805 (Degussa) and Eusolex® T2000 (Merck). Suitable hydrophobic coating materials are, above all, silicones and, among these, especially trialkoxyoctylsilanes or simethicones. So-
30 called micro- or nanopigments are preferably used in sun protection

products. Micronized zinc oxide is preferably used.

Biogenic agents and antioxidants

In the context of the invention, biogenic agents are, for example,
5 tocopherol, tocopherol acetate, tocopherol palmitate, ascorbic acid,
(deoxy)ribonucleic acid and fragmentation products thereof, β -glucans,
retinol, bisabolol, allantoin, phytantriol, panthenol, AHA acids, amino acids,
ceramides, pseudoceramides, essential oils, plant extracts, for example
prunus extract, bambara nut extract, and vitamin complexes.

10 Antioxidants interrupt the photochemical reaction chain which is
initiated when UV rays penetrate into the skin. Typical examples are amino
acids (for example glycine, histidine, tyrosine, tryptophane) and derivatives
thereof, imidazoles (for example urocanic acid) and derivatives thereof,
peptides, such as D,L-carnosine, D-carnosine, L-carnosine and derivatives
15 thereof (for example anserine), carotinoids, carotenes (for example α -
carotene, β -carotene, lycopene) and derivatives thereof, chlorogenic acid
and derivatives thereof, liponic acid and derivatives thereof (for example
dihydroliponic acid), aurothioglucose, propylthiouracil and other thiols (for
example thioredoxine, glutathione, cysteine, cystine, cystamine and
20 glycosyl, N-acetyl, methyl, ethyl, propyl, amyl, butyl and lauryl, palmitoyl,
oleyl, γ -linoleyl, cholesteryl and glyceryl esters thereof) and their salts,
dilaurylthiodipropionate, distearylthiodipropionate, thiodipropionic acid and
derivatives thereof (esters, ethers, peptides, lipids, nucleotides, nucleo-
sides and salts) and sulfoximine compounds (for example butionine
25 sulfoximines, homocysteine sulfoximine, butionine sulfones, penta-, hexa-
and hepta-thionine sulfoximine) in very small compatible dosages (for
example pmole to μ mole/kg), also (metal) chelators (for example α -
hydroxyfatty acids, palmitic acid, phytic acid, lactoferrine), α -hydroxy acids
(for example citric acid, lactic acid, malic acid), humic acid, bile acid, bile
30 extracts, bilirubin, biliverdin, EDTA, EGTA and derivatives thereof,

unsaturated fatty acids and derivatives thereof (for example γ -linolenic acid, linoleic acid, oleic acid), folic acid and derivatives thereof, ubiquinone and ubiquinol and derivatives thereof, vitamin C and derivatives thereof (for example ascorbyl palmitate, Mg ascorbyl phosphate, ascorbyl acetate),
5 tocopherols and derivatives (for example vitamin E acetate), vitamin A and derivatives (vitamin A palmitate) and coniferyl benzoate of benzoin resin, rutinic acid and derivatives thereof, α -glycosyl rutin, ferulic acid, furfurylidene glucitol, carnosine, butyl hydroxytoluene, butyl hydroxyanisole, nordihydroguaiac resin acid, nordihydroguaiaretic acid, trihydroxy-
10 butyrophene, uric acid and derivatives thereof, mannose and derivatives thereof, Superoxid-Dismutase, zinc and derivatives thereof (for example ZnO, ZnSO₄), selenium and derivatives thereof (for example selenium methionine), stilbenes and derivatives thereof (for example stilbene oxide, trans-stilbene oxide) and derivatives of these active substances suitable for
15 the purposes of the invention (salts, esters, ethers, sugars, nucleotides, nucleosides, peptides and lipids).

Deodorants and germ inhibitors

Cosmetic deodorants counteract, mask or eliminate body odors.
20 Body odors are formed through the action of skin bacteria on apocrine perspiration which results in the formation of unpleasant-smelling degradation products. Accordingly, deodorants contain active principles which act as germ inhibitors, enzyme inhibitors, odor absorbers or odor maskers.

25

➤ Germ inhibitors

Basically, suitable germ inhibitors are any substances which act against gram-positive bacteria such as, for example, 4-hydroxybenzoic acid and salts and esters thereof, N-(4-chlorophenyl)-N'-
30 (3,4-dichlorophenyl)-urea, 2,4,4'-trichloro-2'-hydroxydiphenylether

(triclosan), 4-chloro-3,5-dimethylphenol, 2,2'-methylene-bis-(6-bromo-4-chlorophenol), 3-methyl-4-(1-methylethyl)-phenol, 2-benzyl-4-chlorophenol, 3-(4-chlorophenoxy)-propane-1,2-diol, 3-iodo-2-propinyl butyl carbamate, chlorhexidine, 3,4,4'-trichlorocarbanilide (TTC), antibacterial perfumes, thymol, thyme oil, eugenol, clove oil, menthol, mint oil, farnesol, phenoxyethanol, glycerol monocaprate, glycerol monocaprylate, glycerol monolaurate (GML), diglycerol monocaprate (DMC), salicylic acid-N-alkylamides such as, for example, salicylic acid-n-octyl amide or salicylic acid-n-decyl amide.

➤ Enzyme inhibitors

Suitable enzyme inhibitors are, for example, esterase inhibitors. Esterase inhibitors are preferably trialkyl citrates, such as trimethyl citrate, tripropyl citrate, triisopropyl citrate, tributyl citrate and, in particular, triethyl citrate (Hydagen® CAT). Esterase inhibitors inhibit enzyme activity and thus reduce odor formation. Other esterase inhibitors are sterol sulfates or phosphates such as, for example, lanosterol, cholesterol, campesterol, stigmasterol and sitosterol sulfate or phosphate, dicarboxylic acids and esters thereof, for example glutaric acid, glutaric acid monoethyl ester, glutaric acid diethyl ester, adipic acid, adipic acid monoethyl ester, adipic acid diethyl ester, malonic acid and malonic acid diethyl ester, hydroxycarboxylic acids and esters thereof, for example citric acid, malic acid, tartaric acid or tartaric acid diethyl ester, and zinc glycinate.

➤ Odor absorbers

Suitable odor absorbers are substances which are capable of absorbing and largely retaining the odor-forming compounds. They reduce the partial pressure of the individual components and thus

also reduce the rate at which they spread. An important requirement in this regard is that perfumes must remain unimpaired. Odor absorbers are not active against bacteria. They contain, for example, a complex zinc salt of ricinoleic acid or special perfumes of largely neutral odor known to the expert as "fixateurs" such as, for example, extracts of ladanum or styrax or certain abietic acid derivatives as their principal component. Odor maskers are perfumes or perfume oils which, besides their odor-masking function, impart their particular perfume note to the deodorants. Suitable perfume oils are, for example, mixtures of natural and synthetic fragrances. Natural fragrances include the extracts of blossoms, stems and leaves, fruits, fruit peel, roots, woods, herbs and grasses, needles and branches, resins and balsams. Animal raw materials, for example civet and beaver, may also be used. Typical synthetic perfume compounds are products of the ester, ether, aldehyde, ketone, alcohol and hydrocarbon type. Examples of perfume compounds of the ester type are benzyl acetate, p-tert.butyl cyclohexylacetate, linalyl acetate, phenyl ethyl acetate, linalyl benzoate, benzyl formate, allyl cyclohexyl propionate, styryl propionate and benzyl salicylate. Ethers include, for example, benzyl ethyl ether while aldehydes include, for example, the linear alkanals containing 8 to 18 carbon atoms, citral, citronellal, citronellyloxyacetaldehyde, cyclamen aldehyde, hydroxycitronellal, lilial and bourgeonal. Examples of suitable ketones are the ionones and methyl cedryl ketone. Suitable alcohols are anethol, citronellol, eugenol, isoeugenol, geraniol, linalool, phenylethyl alcohol and terpineol. The hydrocarbons mainly include the terpenes and balsams. However, it is preferred to use mixtures of different perfume compounds which, together, produce an agreeable fragrance. Other suitable perfume oils are essential oils of relatively

low volatility which are mostly used as aroma components. Examples are sage oil, camomile oil, clove oil, lemon balm oil, mint oil, cinnamon leaf oil, lime-blossom oil, juniper berry oil, vetiver oil, olibanum oil, galbanum oil, ladanum oil and lavendin oil. The following are preferably used either individually or in the form of mixtures: bergamot oil, dihydromyrcenol, lilial, lyral, citronellol, phenylethyl alcohol, α -hexylcinnamaldehyde, geraniol, benzyl acetone, cyclamen aldehyde, linalool, Boisambrene Forte, Ambroxan, indole, hedione, sandelice, citrus oil, mandarin oil, orange oil, allylamyl glycolate, cyclovertal, lavendin oil, clary oil, β -damascone, geranium oil bourbon, cyclohexyl salicylate, Vertofix Coeur, Iso-E-Super, Fixolide NP, evernyl, iraldein gamma, phenylacetic acid, geranyl acetate, benzyl acetate, rose oxide, romillat, irotyl and floramat.

15

➤ Antiperspirants

Antiperspirants reduce perspiration and thus counteract underarm wetness and body odor by influencing the activity of the eccrine sweat glands. Aqueous or water-free antiperspirant formulations typically contain the following ingredients:

20

- astringent active principles,
- oil components,
- nonionic emulsifiers,
- 25 ➤ co-emulsifiers,
- consistency factors,
- auxiliaries in the form of, for example, thickeners or complexing agents and/or
- non-aqueous solvents such as, for example, ethanol,
- 30 propylene glycol and/or glycerol.

Suitable astringent active principles of antiperspirants are, above all, salts of aluminium, zirconium or zinc. Suitable antihydrotic agents of this type are, for example, aluminium chloride, aluminium chlorohydrate, aluminium dichlorohydrate, aluminium sesquichlorohydrate and complex compounds thereof, for example with 1,2-propylene glycol, aluminium hydroxyallantoinate, aluminium chloride tartrate, aluminium zirconium trichlorohydrate, aluminium zirconium tetrachlorohydrate, aluminium zirconium pentachlorohydrate and complex compounds thereof, for example with amino acids, such as glycine. Oil-soluble and water-soluble auxiliaries typically encountered in antiperspirants may also be present in relatively small amounts. Oil-soluble auxiliaries such as these include, for example,

- inflammation-inhibiting, skin-protecting or pleasant-smelling essential oils,
- synthetic skin-protecting agents and/or
- oil-soluble perfume oils.

Typical water-soluble additives are, for example, preservatives, water-soluble perfumes, pH adjusters, for example buffer mixtures, water-soluble thickeners, for example water-soluble natural or synthetic polymers such as, for example, xanthan gum, hydroxyethyl cellulose, polyvinyl pyrrolidone or high molecular weight polyethylene oxides.

Film formers

Standard film formers are, for example, chitosan, microcrystalline chitosan, quaternized chitosan, polyvinyl pyrrolidone, vinyl pyrrolidone/vinyl acetate copolymers, polymers of the acrylic acid series, quaternary

cellulose derivatives, collagen, hyaluronic acid and salts thereof and similar compounds.

Antidandruff agents

5 Suitable antidandruff agents are piroctone olamine (1-hydroxy-4-methyl-6-(2,4,4-trimethylpentyl)-2-(1H)-pyridinone monoethanolamine salt), Baypival® (Climbazole), Ketoconazol® (4-acetyl-1-{4-[2-(2,4-dichlorophenyl) r-2-(1H-imidazol-1-ylmethyl)-1,3-dioxylan-c-4-ylmethoxy-phenyl]-piperazine, ketoconazole, elubiol, selenium disulfide, colloidal
10 sulfur, sulfur polyethylene glycol sorbitan monooleate, sulfur ricinol polyethoxylate, sulfur tar distillate, salicylic acid (or in combination with hexachlorophene), undecylenic acid, monoethanolamide sulfosuccinate Na salt, Lamepon® UD (protein/undecylenic acid condensate), zinc pyrithione, aluminum pyrithione and magnesium pyrithione/dipyrithione magnesium
15 sulfate.

Swelling agents, insect repellents, self-tanning agents and depigmenting agents

20 Suitable swelling agents for aqueous phases are montmorillonites, clay minerals, Pemulen and alkyl-modified Carbopol types (Goodrich). Suitable insect repellents are N,N-diethyl-m-toluamide, pentane-1,2-diol or Ethyl Butylacetylaminopropionate. A suitable self-tanning agent is dihydroxyacetone. Suitable tyrosine inhibitors which prevent the formation of melanin and are used in depigmenting agents are, for example, arbutin,
25 ferulic acid, koji acid, coumaric acid and ascorbic acid (vitamin C).

Hydrotropes

30 In addition, hydrotropes, for example ethanol, isopropyl alcohol or polyols, may be used to improve flow behavior. Suitable polyols preferably contain 2 to 15 carbon atoms and at least two hydroxyl groups. The

polyols may contain other functional groups, more especially amino groups, or may be modified with nitrogen. Typical examples are

- glycerol;
- 5 ➤ alkylene glycols such as, for example, ethylene glycol, diethylene glycol, propylene glycol, butylene glycol, hexylene glycol and polyethylene glycols with an average molecular weight of 100 to 1000 dalton;
- technical oligoglycerol mixtures with a degree of self-condensation of 1.5 to 10 such as, for example, technical diglycerol mixtures with a
10 diglycerol content of 40 to 50% by weight;
- methylol compounds such as, in particular, trimethylol ethane, trimethylol propane, trimethylol butane, pentaerythritol and dipentaerythritol;
- lower alkyl glucosides, particularly those containing 1 to 8 carbon atoms
15 in the alkyl group, for example methyl and butyl glucoside;
- sugar alcohols containing 5 to 12 carbon atoms, for example sorbitol or mannitol,
- sugars containing 5 to 12 carbon atoms, for example glucose or sucrose;
- 20 ➤ amino sugars, for example glucamine;
- dialcoholamines, such as diethanolamine or 2-aminopropane-1,3-diol.

Preservatives

- Suitable preservatives are, for example, phenoxyethanol, formal-
25 dehyde solution, parabens, pentanediol or sorbic acid and the silver complexes known under the name of Surfaccine® and the other classes of compounds listed in Appendix 6, Parts A and B of the **Kosmetikverordnung** ("Cosmetics Directive").

Perfume oils and aromas

Suitable perfume oils are mixtures of natural and synthetic perfumes. Natural perfumes include the extracts of blossoms (lily, lavender, rose, jasmine, neroli, ylang-ylang), stems and leaves (geranium, patchouli, petitgrain), fruits (anise, coriander, caraway, juniper), fruit peel (bergamot, lemon, orange), roots (nutmeg, angelica, celery, cardamom, costus, iris, calmus), woods (pinewood, sandalwood, guaiac wood, cedarwood, rosewood), herbs and grasses (tarragon, lemon grass, sage, thyme), needles and branches (spruce, fir, pine, dwarf pine), resins and balsams (galbanum, elemi, benzoin, myrrh, olibanum, opoponax). Animal raw materials, for example civet and beaver, may also be used. Typical synthetic perfume compounds are products of the ester, ether, aldehyde, ketone, alcohol and hydrocarbon type. Examples of perfume compounds of the ester type are benzyl acetate, phenoxyethyl isobutyrate, p-tert.butyl cyclohexylacetate, linalyl acetate, dimethyl benzyl carbinyl acetate, phenyl ethyl acetate, linalyl benzoate, benzyl formate, ethylmethyl phenyl glycinate, allyl cyclohexyl propionate, styrallyl propionate and benzyl salicylate. Ethers include, for example, benzyl ethyl ether while aldehydes include, for example, the linear alkanals containing 8 to 18 carbon atoms, citral, citronellal, citronellyloxyacetaldehyde, cyclamen aldehyde, hydroxycitronellal, lilial and bourgeonal. Examples of suitable ketones are the ionones, α -isomethylionone and methyl cedryl ketone. Suitable alcohols are anethol, citronellol, eugenol, isoeugenol, geraniol, linalool, phenylethyl alcohol and terpeneol. The hydrocarbons mainly include the terpenes and balsams. However, it is preferred to use mixtures of different perfume compounds which, together, produce an agreeable perfume. Other suitable perfume oils are essential oils of relatively low volatility which are mostly used as aroma components. Examples are sage oil, camomile oil, clove oil, melissa oil, mint oil, cinnamon leaf oil, lime-blossom oil, juniper berry oil, vetiver oil, olibanum oil, galbanum oil, ladanum oil and lavandin

oil. The following are preferably used either individually or in the form of mixtures: bergamot oil, dihydromyrcenol, lilial, lyral, citronellol, phenylethyl alcohol, α -hexylcinnamaldehyde, geraniol, benzyl acetone, cyclamen aldehyde, linalool, Boisambrene Forte, Ambroxan, indole, hedione, sandelice, citrus oil, mandarin oil, orange oil, allylamyl glycolate, cyclovertal, lavandin oil, clary oil, β -damascone, geranium oil bourbon, cyclohexyl salicylate, Vertofix Coeur, Iso-E-Super, Fixolide NP, evernyl, iraldein gamma, phenylacetic acid, geranyl acetate, benzyl acetate, rose oxide, romillat, irotyl and floramat. Suitable aromas are, for example, peppermint oil, spearmint oil, aniseed oil, Japanese anise oil, caraway oil, eucalyptus oil, fennel oil, citrus oil, wintergreen oil, clove oil, menthol and the like.

Dyes

Suitable dyes are any of the substances suitable and approved for cosmetic purposes as listed, for example, in the publication "**Kosmetische Färbemittel**" of the Farbstoffkommission der Deutschen Forschungsgemeinschaft, **Verlag Chemie, Weinheim, 1984, pages 81 to 106**. Examples include cochineal red A (C.I. 16255), patent blue V (C.I. 42051), indigotin (C.I. 73015), chlorophyllin (C.I. 75810), quinoline yellow (C.I. 47005), titanium dioxide (C.I. 77891), indanthrene blue RS (C.I. 69800) and madder lake (C.I. 58000). Luminol may also be present as a luminescent dye. These dyes are normally used in concentrations of 0.001 to 0.1% by weight, based on the mixture as a whole.

The total percentage content of auxiliaries and additives may be from 1 to 50% by weight and is preferably from 5 to 40% by weight, based on the particular preparations. The preparations may be produced by standard hot or cold processes and are preferably produced by the phase inversion temperature method.

Examples

A number of Formulation Examples for skin and hair treatment preparations are presented in the following Table. The figures shown represent percentages by weight.

Table 1

Examples of cosmetic preparations (water, preservative to 100% by weight)

Composition (INCI)	1	2	3	4	5	6	7	8	9	10
Texapon® NSO Sodium Laureth Sulfate	-	-	-	-	-	-	38.0	38.0	25.0	-
Texapon® SB 3 Disodium Laureth Sulfosuccinate	-	-	-	-	-	-	-	-	10.0	-
Plantacare® 818 Coco Glucosides	-	-	-	-	-	-	7.0	7.0	6.0	-
Plantacare® PS 10 Sodium Laureth Sulfate (and) Coco Glucosides	-	-	-	-	-	-	-	-	-	16.0
Dehyton® PK 45 Cocamidopropyl Betaine	-	-	-	-	-	-	-	-	10.0	-
Dehyquart® A Cetrimonium Chloride	2.0	2.0	2.0	2.0	4.0	4.0	-	-	-	-
Dehyquart L® 80 Dicocoylmethylethoxymonium Methosulfate (and) Propylenglycol	1.2	1.2	1.2	1.2	0.6	0.6	-	-	-	-
Eumulgin® B2 Ceteareth-20	0.8	0.8	-	0.8	-	1.0	-	-	-	-
Eumulgin® VL 75 Lauryl Glucoside (and) Polyglyceryl-2 Polyhydroxystearate (and) Glycerin	-	-	0.8	-	0.8	-	-	-	-	-
Lanette® O Cetearyl Alcohol	2.5	2.5	2.5	2.5	3.0	2.5	-	-	-	-
Cutina® GMS Glyceryl Stearate	0.5	0.5	0.5	0.5	0.5	1.0	-	-	-	-
Cetiol® HE PEG-7 Glyceryl Cocoate	1.0	-	-	-	-	-	-	-	1.0	-
Cetiol® PGL Hexyldecanol (and) Hexyldecyl Laurate	-	1.0	-	-	1.0	-	-	-	-	-
Cetiol® V Decyl Oleate	-	-	-	1.0	-	-	-	-	-	-
Eutanol® G Octyldodecanol	-	-	1.0	-	-	1.0	-	-	-	-
Nutrilan® Keratin W Hydrolyzed Keratin	-	-	-	2.0	-	-	-	-	-	-
Lamesoft® LMG Glyceryl Laurate (and) Potassium Cocoyl Hydrolyzed Collagen	-	-	-	-	-	-	3.0	2.0	4.0	-
Euperlan® PK 3000 AM Glycol Distearate (and) Laureth-4 (and) Cocamidopropyl Betaine	-	-	-	-	-	-	-	3.0	5.0	5.0
Glycyrrhetic acid zinc salt	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Benzoylperoxid	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Copherol® 1250 Tocopherol Acetate	-	-	0.1	0.1	-	-	-	-	-	-
Arlypon® F Laureth-2	-	-	-	-	-	-	3.0	3.0	1.0	-
Sodium Chloride	-	-	-	-	-	-	-	1.5	-	1.5

(1-4) Hair rinse, (5-6) Hair conditioner, (7-8) Shower bath, (9) Shower gel, (10) Wash lotion

Table 1 continued

Examples of cosmetic preparations (water, preservative to 100% by weight)

Composition (INCI)	11	12	13	14	15	16	17	18	19	20
Texapon® NSO Sodium Laureth Sulfate	20.0	20.0	12.4	-	25.0	11.0	-	-	-	-
Texapon® K 14 S Sodium Myreth Sulfate	-	-	-	-	-	-	-	-	11.0	23.0
Texapon® SB 3 Disodium Laureth Sulfosuccinate	-	-	-	-	-	7.0	-	-	-	-
Plantacare® 818 Coco Glucosides	5.0	5.0	4.0	-	-	-	-	-	6.0	4.0
Plantacare® 2000 Decyl Glucoside	-	-	-	-	5.0	4.0	-	-	-	-
Plantacare® PS 10 Sodium Laureth Sulfate (and) Coco Glucosides	-	-	-	40.0	-	-	16.0	17.0	-	-
Dehyton® PK 45 Cocamidopropyl Betaine	20.0	20.0	-	-	8.0	-	-	-	-	7.0
Eumulgin® B1 Ceteareth-12	-	-	-	-	1.0	-	-	-	-	-
Eumulgin® B2 Ceteareth-20	-	-	-	1.0	-	-	-	-	-	-
Lameform® TGI Polyglyceryl-3 Isostearate	-	-	-	4.0	-	-	-	-	-	-
Dehymuls® PGPH Polyglyceryl-2 Dipolyhydroxystearate	-	-	1.0	-	-	-	-	-	-	-
Monomuls® 90-L 12 Glyceryl Laurate	-	-	-	-	-	-	-	-	1.0	1.0
Cetiol® HE PEG-7 Glyceryl Cocoate	-	0.2	-	-	-	-	-	-	-	-
Eutanol® G Octyldodecanol	-	-	-	3.0	-	-	-	-	-	-
Nutrilan® Keratin W Hydrolyzed Keratin	-	-	-	-	-	-	-	-	2.0	2.0
Nutrilan® I Hydrolyzed Collagen	1.0	-	-	-	-	2.0	-	2.0	-	-
Lamesoft® LMG Glyceryl Laurate (and) Potassium Cocoyl Hydrolyzed Collagen	-	-	-	-	-	-	-	-	1.0	-
Lamesoft® 156 Hydrogenated Tallow Glyceride (and) Potassium Cocoyl Hydrolyzed Collagen	-	-	-	-	-	-	-	-	-	5.0
Gludain® WK Sodium Cocoyl Hydrolyzed Wheat Protein	1.0	1.5	4.0	1.0	3.0	1.0	2.0	2.0	2.0	-
Euperlan® PK 3000 AM Glycol Distearate (and) Laureth-4 (and) Cocamidopropyl Betaine	5.0	3.0	4.0	-	-	-	-	3.0	3.0	-
Arypon® F Laureth-2	2.6	1.6	-	1.0	1.5	-	-	-	-	-
Glyceryl ricinoleic acid zinc salt	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Hydagen® CMF Chitosan	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sodium Chloride	-	-	-	-	-	1.6	2.0	2.2	-	3.0
Glycerin (86% by wt.)	-	5.0	-	-	-	-	-	1.0	3.0	-

(11-14) 2-in-1 Shower bath, (15-20) Shampoo

Table 1 continued

Examples of cosmetic preparations (water, preservative to 100% by weight)

Composition (INCI)	21	22	23	24	25	26	27	28	29	30
Texapon® NSO Sodium Laureth Sulfate	-	30.0	30.0	-	25.0	-	-	-	-	-
Plantacare® 818 Coco Glucosides	-	10.0	-	-	20.0	-	-	-	-	-
Plantacare® PS 10 Sodium Laureth Sulfate (and) Coco Glucosides	22.0	-	5.0	22.0	-	-	-	-	-	-
Dehyton® PK 45 Cocamidopropyl Betaine	15.0	10.0	15.0	15.0	20.0	-	-	-	-	-
Emulgade® SE Glyceryl Sterate (and) Ceteareth 12/20 (and) Cetearyl Alcohol (and) Cetyl Palmitate	-	-	-	-	-	5.0	5.0	4.0	-	-
Eumulgin® B1 Ceteareth-12	-	-	-	-	-	-	-	1.0	-	-
Lameform® TGI Polyglyceryl-3 Isostearate	-	-	-	-	-	-	-	-	4.0	-
Dehymuls® PGPH Polyglyceryl-2 Dipolyhydroxystearate	-	-	-	-	-	-	-	-	-	4.0
Monomuls® 90-O 18 Glyceryl Oleate	-	-	-	-	-	-	-	-	2.0	-
Cetiol® HE PEG-7 Glyceryl Cocoate	2.0	-	-	2.0	5.0	-	-	-	-	2.0
Cetiol® OE Dicaprylyl Ether	-	-	-	-	-	-	-	-	5.0	6.0
Cetiol® PGL Hexyldecanol (and) Hexyldecyl Laurate	-	-	-	-	-	-	-	3.0	10.0	9.0
Cetiol® SN Cetearyl Isononanoate	-	-	-	-	-	3.0	3.0	-	-	-
Cetiol® V Decyl Oleate	-	-	-	-	-	3.0	3.0	-	-	-
Myritol® 318 Coco Caprylate Caprate	-	-	-	-	-	-	-	3.0	5.0	5.0
Bees Wax	-	-	-	-	-	-	-	-	7.0	5.0
Nutrilan® Elastin E20 Hydrolyzed Elastin	-	-	-	-	-	2.0	-	-	-	-
Nutrilan® I-50 Hydrolyzed Collagen	-	-	-	-	2.0	-	2.0	-	-	-
Gluadin® AGP Hydrolyzed Wheat Gluten	0.5	0.5	0.5	-	-	-	-	0.5	-	-
Gluadin® WK Sodium Cocoyl Hydrolyzed Wheat Protein	2.0	2.0	2.0	2.0	5.0	-	-	-	0.5	0.5
Euperlan® PK 3000 AM Glycol Distearate (and) Laureth-4 (and) Cocamidopropyl Betaine	5.0	-	-	5.0	-	-	-	-	-	-
Arlypon® F Laureth-2	-	-	-	-	-	-	-	-	-	-
Glycyrrhetic acid zinc salt	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Hydagen® CMF Chitosan	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Magnesium Sulfate Hepta Hydrate	-	-	-	-	-	-	-	-	1.0	1.0
Glycerin (86% by wt.)	-	-	-	-	-	3.0	3.0	5.0	5.0	3.0

(21-25) Foam bath, (26) Soft cream, (27, 28) Moisturizing emulsion, (29, 30) Night cream